Introducing CostQuest's Broadband Mapping and Analysis Service:

CQconnect™

CostQuest Associates
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Introduction

Broadband Internet access is as important to education, economic development and communities as roads, rails and canals were 100 years ago. However, achieving ubiquitous or universal access to broadband Internet access, in a manner that matches the adoption of these other historic infrastructure elements, has presented many challenges and hurdles.

For many communities, especially rural communities, ubiquitous broadband access is not a reality. Government entities struggle to find the best method for encouraging further broadband deployment. No matter which method is chosen, the first critical step in any broadband initiative is to assess the current availability of broadband, map the landscape of providers and technologies in the field, and analyze all the factors that bear upon deployment decisions, from the costs to the demographics and location of community services that will eventually draw on those expanded broadband services.

> "We must have more reliable information about broadband deployment and consumer adoption as a first step in developing any comprehensive blueprint for America's broadband future. . . . A national, searchable map will assist local communities to assess their own broadband inventory."
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> *--Statement of Rep. Edward Markey upon approval by the House Energy and Commerce Committee of his Broadband Census Bill, H.R. 3919, October 30, 2007.*

CostQuest Associates has developed a broadband mapping and analysis service--*CQconnect™* unlike other services available on the market. *CQconnect*™ uses proven cost analysis models that examine the cost per household in delivering broadband access. CostQuest's *CQconnect*™ can incorporate either a demand-side, or supply-side methodology. Our approach can identify served, unserved, and underserved areas and population. It also models the investment needed to build out to the unserved areas.

CQconnect™ can identify:

- **Unserved Areas** - Gaps in broadband service
- **Served Areas** - Areas that are currently served by broadband, by provider
- **Available Technologies** - Each broadband technology available in an area

- **Transmission Speeds** – Tiers of speed or data through-put available to a served area
- **Demand** - Influencing factors including residential population, households, businesses, schools, hospitals, economic centers, roads
- **Cost to Serve** – Investment necessary to build out to un-served areas by various broadband technologies (Cable, DSL, Fixed Wireless, Satellite)

Our studies and models are used by governments, service providers, and industry associations all over the world. We recently concluded a comprehensive service inventory study for mobile wireless service for the entire United States. Our broadband cost model and is currently in use in the State of Wyoming and is being considered by other states and entities.

Supply-Side and Demand-Side Approach

Solutions to broadband shortages come in all shapes and sizes. Typically they can be categorized as either supply-side or demand-side.

In terms of the demand side, there can be an incentive programs that induce consumers, businesses and governments to increase utilization of existing broadband networks. States might encourage government usage of broadband applications, such as distance learning, telehealth, and e-government initiatives. States might provide financial support that encourages the use of broadband applications for public safety or community learning or other public service resources. Or states could help business discover pockets of unserved broadband "hungry" consumers. All of these are considered "demand-side" programs, because they are aimed at increasing the demand for broadband services.

On the supply side, a policy could involve expanding the supply of broadband services. This approach might suggest that municipalities provide broadband services to their citizens through their own network. States might also develop financial incentives, such as grants and subsidies, to support the expansion of existing broadband networks. These methods are considered "supply-side" approaches because they create incentives for carriers to expand their reach and increase the overall supply of broadband services.

How CQconnect supports the Supply-side approach

Service Providers

The mapping and inventory of existing infrastructure provided by *CQconnect*™ allows existing carriers to see additional market potential and allows carriers to identify opportunities. Essentially, our solution gives providers much-needed return on investment information for unserved and underserved areas.

Policy Makers

A recent Brookings Institution policy paper on the economic impact of broadband indicates several areas where policy makers can focus. The paper concludes that "States have few policy levers that affect the overall demand for broadband. However, given that the demand

for broadband is price elastic, the most effective policies are likely to be those that contribute to lower prices.."[1]

The CostQuest approach allows policy makers to develop a cost to serve measurement across technologies that can balance the strengths and weaknesses of a given solution. Deployment costs vary greatly across technologies due to geography, density, and current asset locations. Although, we found that in lower density areas, where other terrestrial assets were absent, fixed wireless (WISP) is often the most economically viable alternative. However, it is also the broadband service most sensitive to increasing throughput demand by consumers.

Understanding the investment necessary to deploy broadband services reveals a number of solutions for decision-makers.

Through the identification of high cost areas, policy makers can start to understand what existing programs (state and federal) might encourage providers to deploy in these high cost areas.

Supporting the Demand-side Approach

Understanding where potential, or likely, demand exists is critical even prior to any attempts to create demand. This includes the demand by residential, business, government, and mobile customers. This information is essential to providers contemplating infrastructure investments, including upgrades to existing facilities.

The stimulation of potential broadband demand can be achieved in different ways given location. This could include informational programs for different demand segments (e.g., making sure schools, and hospitals are aware of federal support programs for broadband). Policy makers may decide to subsidize broadband demand at some point in time. Such funding options must be considered carefully.[2]

Our approach allows policy makers to understand the demand profile of a given area. This includes understanding the mix of residential demographics, business locations and types, schools, libraries, health care, and government campuses. This will help in the development of the plan for each community.

Finally, the CostQuest solution allows consumers to have access to information. This could include a web-based mapping and query tool that allows consumers to select their location and see the high-speed options available to them, including transmission speeds, technology types, carrier contact information, and pricing packages.

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[1] "The Effects of Broadband Deployment on Output and Employment: A Cross-sectional Analysis of U.S. Data," with Robert Crandall and Robert Litan, The Brookings Institution: Issues in Economic Policy, Number 6, July 2007. http://www3.brookings.edu/views/papers/crandall/200706litan.pdf

[2] For example, CostQuest has performed research related to reverse auctions for universal service support.

Methodology Overview

CQconnect™ is designed to gather data and produce results in four phases: gather data, develop geospatial information, layer demographic and geographic information, and apply cost and network modeling analysis.

Phase 1

Gather Provider Data – In the first phase of our work, we identify the service providers and obtain information regarding their network architecture, service boundaries, and costs.

The core of our approach stems from the belief that a successful broadband initiative depends on a sound informational foundation, built from an assessment of the current situation. These foundational steps allow us to develop a study that reflects the unique attributes and issues of each area. CostQuest maintains an independent and agnostic position with respect to service providers. We work with service providers and obtain information regarding their costs, network architecture and service boundaries. Service providers feel inherently comfortable sharing this proprietary information with us because we have built a foundation of trust over many years of working with them.

Phase 2

Development of Geospatial Information - CostQuest layers its time-tested cost analysis onto the provider data and offers a value-added, cost-effective solution. In this second phase, CostQuest develops and catalogs the geospatial information received in the prior phase. This step involves either the integration of digital data submitted by providers or developing GIS layer files using other sources. Based on the information provided, combined with appropriate public data, we develop a geospatial data set, and combine it with base mapping and analysis within a standard unit of geography.

Phase 3

Demographic and Geographic Layering - The third phase of the *CQconnect*™ service combines the data created in the second phase with baseline demographic and geospatial data. This phase allows the development of maps that illustrate the areas that are unserved and calculates population and housing unit count in the served and unserved areas.

In this phase we also determine service provider and broadband boundaries, and overlay customer data and US Census data. This approach allows the development of maps and analyses that illustrate areas within the studied counties that are served and unserved, and calculates population and housing unit counts in these areas.

Phase 4

Cost and Network Modeling - The final phase of the *CQconnect*™ process distills all of the information from the prior phases and combines this with CostQuest's proprietary cost analysis. CostQuest's cost model, CostPro, is a forward-looking model used to estimate the cost of deploying broadband throughout the state. It is based upon well proven forward-looking network engineering and geospatial algorithms.

The CostPro cost model has as its foundation in a series of proprietary algorithms that have been used for forward-looking economic-engineering studies. The model was borne from a regulatory need to develop cost for Unbundled Network Elements, Universal Service and interconnection studies. Over the past several years the model has been extended to be used in business planning, network rebuild, and deployment estimates domestically and internationally. For land line technologies, the model takes great care to run plant along roads and obey road network pathing to connect points of demand. A clustering algorithm was employed to efficiently server wireless broadband customers.

Conclusion

In the highly complex arena of broadband deployment, governments need services and tools they can trust to provide accurate, meaningful and usable information and analysis. CostQuest's new service--*CQconnect*™--is the right solution at the right time.

CostQuest's experience in telecommunications, and its expertise in data analysis and GIS mapping, gives policy makers the assurances they need that their resources will produce results. CostQuest's service adds considerable value to the basic prospect of mapping broadband. We believe that there is not a one size fits all solution to understanding and solving the broadband puzzle. Our goal is to provide a series of tools and services that can be used to solve a number of common policy challenges.